



# Science News-Letter

*The Weekly Summary of Current Science*

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ARCHAEOLOGY

## Indian City of the Dead Found in Illinois

By FRANK THONE

An Indian City of the Dead. That is what George Langford of Joliet has discovered out on the prairies, where the Des Plaines and Kankakee rivers converge to form the Illinois. The valley of this classical American river, used as a highway to the West by the French in the time of Marquette and LaSalle and by the early Americans in the days of the Great Expansion, was also a road for the red men who held the land before them. Historians have long known how important the Illinois river was to the Indians, but the discoveries which Mr. Langford has made, by years of patient and unnoticed digging in a group of neglected mounds near its source, have shown that all the events of known historic time in this region have been matters of yesterday, and that the human drama here probably reaches back a thousand unknown years for every hundred that have so far been recorded in the books. With very modest equipment and one devoted assistant, working only in his spare time, he has brought to light evidences of one vanished people living above the graves of another until they in their turn passed and left their bones to be built upon by later comers. Such a layer-arrangement or stratification of relics of Indian occupation in America has been virtually unknown, but here in his Indian city of the dead Mr. Langford has found three very well-marked layers of burials marking three very distinct tribal cultures; and the lowermost layer probably is double, making four layers in all. It is an aboriginal American Troy, silent for lack of a Homer.

Digging down into any archaeological site is like reading history backwards. One naturally finds the most recent things first, since they were



SKULL FROM ONE OF THE BURIALS, with accompanying funeral gifts. The departed squaw was given a supply of food (in the pots), skin-scraping tools, axes for fire-making, etc.

buried last, at the top of the heap. Thus the first burials found in the Fisher mounds, only a little under the grass roots, were the remains of Indians as recent as American colonial days. There were definite traces of contact with white traders, in the form of silver buckles and brooches, on some of which the manufacturer had stamped his trade-mark. The bones of one child were in this layer, and with them were glass and china beads and a few fragments of cloth, all of European manufacture. But the lowermost graves in this layer have no such relics, only the chipped stone arrow points and broken pottery of the Indians themselves. Thus the last chapter in the unwritten Iliad of the Mounds ties in with the story of the coming of the white man. When they began burying their dead on top of the already ancient hecatomb he had not yet come; in the midst of their time he came, and his coming was as the stroke of Fate, rendering inevitable their departure from the homes they had held and

the graves they had guarded for many generations.

But the passing of the last of the Indian tribes before the white man's invasion was only the latest of a series of such successions. As Mr. Langford went down through these buried records of the past, he came next to a most abundant fund of human remains, with ornaments, utensils, and weapons, constituting the real bulk of his discoveries. They were a very different people from those who had remained to meet the white man, for their workmanship was radically different, and all the skulls he found were of a "round-headed" type, whereas the skulls of the later people were markedly broad.

This middle layer contains the real cream of Mr. Langford's discoveries, but he restrained his eagerness to explore it until he had dug clear to the bottom of the mound and on past the original ground level. Here he found the real beginnings of the burial pile in a series of very ancient graves in the hard, gravelly earth. These primitives differed from the later peoples of the middle and upper layers in their burial customs, for they left no funeral gifts with their dead, save for a few pieces of flint, so rough that Mr. Langford is uncertain whether they are the products of human workmanship at all. Times must have been hard in the days of these prehistoric Indians, and birth as perilous as battle; for every one of the adult female skeletons found by Mr. Langford in this layer had beside it the pitiful bones of a newborn baby.

This layer of very ancient burials, made beneath the natural ground surface before there were any mounds at all, contains strong indications that it is really double, and that it represents two racial subdivisions rather than one. For while all the burials are alike in having few funeral gifts, or none,

(Just turn the page)

## Indian Mounds

(Continued from Page 161)

and in the crouched, "sleeping" positions of the skeletons, their skulls separate rather clearly into two physical types, one group being long-headed and the other medium-headed, or "mesos" as Mr. Langford terms them. The long-heads were the pioneers; they occupy the lowermost graves, and where one burial has been made above another the long-head is always beneath and the "meso" above.

The bulk of the mounds, as already stated, is occupied by the graves of a "middle people," who lie between the long- and meso-headed primitives beneath and the graves of the recent culture near the surface. The people of this middle layer were not the tall and robust athletes that used to be pictured in books as the "noble red man." They were a slightly-built race of low stature, the men averaging only five feet six inches, and some of the women failing to reach even five feet. They had good heads, though, and this combination of intelligent brains with deficient size and muscular strength conditioned their whole culture.

The most obvious of their adaptations to a hard and hostile world is seen in their weapons, which are found abundantly in their graves—for they left generous funeral gifts with their dead. Their spear and arrow points are slender and very sharp, their tomahawk heads keenly edged and exquisitely polished. They represent indeed some of the finest of known prehistoric Indian workmanship. These weapons are obviously those of a people who knew that they were not well fitted for rough-and-tumble, hand-to-hand fighting, and who therefore undertook to make up for their deficiency in brute force by superiority in the quality of their arms. They were apparently a people of archers, who chose their own battle range and never permitted their enemies to come to grips, but stood them off and stung them with accurately-shot arrows and well-flung tomahawks and spears.

They were beginning also to learn the use of metals. Mr. Langford has found numerous ornaments of copper and a few copper celts, or tomahawk heads. At first he was inclined to believe that the presence of this metal indicated trade relations with Europeans, and therefore a comparatively recent date for the Indians of the middle layer. But among the funeral gifts of one man was a large nugget of native copper. This shows that there

(Continued on Page 167)

## STUDY HELPS FOR SCIENCE CLASSES

These articles will be found to be especially useful in class work

### GENERAL SCIENCE

Indian City of the Dead Found in Illinois, p. 161. Koreans Problem in Japan, p. 163. Tombs Yield Treasure, p. 165. Wheel Great-est Invention, p. 169. Character in Faces, p. 171. Fossil Ivory Ornaments, p. 171. Traffic Accidents, p. 175. Anniversaries of Science, p. 175. Articles marked with \* in classifications below.

### HYGIENE

Diseases Reach Peak, p. 169.

### CHEMISTRY

Potash Beds Found in Texas,\* p. 163. Chemist and Historian,\* p. 163. 5000 Year Old Glass,\* p. 169.

### BIOLOGY

Vanishing "Hawg," p. 167. Nature Ramb-lings, p. 171. Geraniol Lures Beetle,\* p. 175.

### PHYSICS

Distant Milky Ways,\* p. 165. Meteors Reveal Heavens,\* p. 167.

(This will fit on a 3 x 5 card.)

Science News-Letter, December 11, 1926

## News-Letter Features

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## Koreans Problem in Japan

The frugality of the diet of a Japanese, particularly of the laboring class, is proverbial as the result of western states' campaigns to exclude them because they eat less than American workmen and therefore can work for less. But the Korean coolie is so much more frugal than the Japanese that his numbers in Japan have constituted a serious problem, according to a recent statement from the Department of Labor at Washington.

A veritable flood of cheap Korean labor has swept Japan in recent years, it is said, bringing about a situation so serious that government steps have been taken to meet it. The influx of coolies has amounted to practically a migration, but the Japanese government has yet done nothing to effectually check it. Korean day laborers live so much more cheaply than Japanese and will work for less money, so that the situation somewhat duplicates our problem in the west where Japanese labor conflicted with American standards of living. In fact the situation has somewhat brought an understanding and sympathy for the American attitude toward immigrant labor.

Korean laborers in Japan are largely engaged in the heavier and rougher tasks such as railway and road making, and the hauling of goods. The great improvement in living standards of the Japanese in the past decade has resulted in an unwillingness on their part to perform the harder and more menial tasks. They are, therefore, willing to let the Koreans do the lower work so long as they can find employment in other lines. The Koreans live in huts and rude shanties and can subsist on food so coarse that the ordinary Japanese will not touch it.

The fact that of about 133,700 Koreans now in Japan only some 23,500 are women was said to have given rise to grave moral problems. Frequent clashes also occur between Japanese and Koreans because of racial prejudices and the competition in industry. Only a fourth of the Koreans have permanent or near-permanent dwellings, the rest are rovers moving from place to place in search of temporary employment, and living almost as campers. The Japanese government has appropriated the sum of about a half million yen to advance at a low interest rate for the construction of cheap homes for the homeless, wandering Koreans.

Science News-Letter, December 11, 1926



EDGAR FAHS SMITH

## Chemist and Historian

While it is for his work in electrochemistry that Prof. Smith has attained most scientific fame and honors, including the award of the Priestley medal by the American Chemical Society at its recent Golden Jubilee meeting, his work as a historian of chemistry is of no less importance.

As professor for many years, and as provost for many years more, of the University of Pennsylvania, he has been especially interested in early chemists connected with that institution, such as Robert Hare, the inventor of the oxy-hydrogen blowpipe. But Prof. Smith's interests have not been solely provincial, as indicated by his "Chemistry in America."

Born in York, Pa., on May 23, 1856, he studied at Pennsylvania College (now Gettysburg College), graduating in 1874, when he went to Germany and studied at Göttingen, receiving his doctorate in 1876. Then he went to the University of Pennsylvania as an instructor in chemistry, and, with the exception of seven years from 1881 to 1888 in other institutions, he has been there ever since. In 1911 he became provost, and when he resigned from academic work in 1920, he was made provost emeritus. But this step has not meant his retirement from active work, for since then he has continued at his researches with unabated zeal, and with more time for them than he ever had before.

Science News-Letter, December 11, 1926

## Potash Beds Found in Texas

American potash, to break the European monopoly based on the Stassfurt fields, is a possibility held out by the results of a core drilling made in cooperation with the U. S. Geological Survey, in the southeastern corner of New Mexico. Mineralogists of the Survey told a representative of Science Service of ten beds of potash minerals aggregating nearly thirty feet in thickness, which the drill struck at depths ranging from 790 feet to 1760 feet. They also showed samples of the core brought up by the drill; most of these consisted of light-colored polyhalite, sylvite and other salts, which they stated assayed as high as 18.5 per cent potash (K<sub>2</sub>O). The beds thick enough for mining averaged about 12.5 per cent, it was stated. The average run-of-the-mine minerals of the Stassfurt beds have a potash content of only 8 or 10 per cent. At about 1430 feet one seventeen-inch bed of a different mineral, langbeinite, was found. This contains about 18 per cent. potash. Langbeinite is merely a mineral curiosity at Stassfurt.

"It must not be imagined that this is simply a lucky strike made at random," said Dr. G. R. Mansfield of the Geological Survey. "We have believed for years that if paying potash deposits were ever to be found in this country the most likely place to seek them would be the panhandle region of Texas and the adjacent corner of New Mexico, and we have actually been hunting for them there since 1915. We have received many indications of the presence of potash, from samples brought up by oil well drills as well as from other sources, and recently Congress appropriated sufficient money to begin a really critical investigation. The present core drilling, however, the first of its kind, which gives us a really accurate picture of what is under ground at that point, was put down by the Snowden-McSweeney Company, an oil concern, on their own initiative and at their own expense but in full cooperation with the Geological Survey.

"Of course we can not tell from a single core drilling how extensive the new beds are," Dr. Mansfield continued, "But we do know definitely now that working quantities of rich potash minerals exist at this place, and our previous work, indicates that potash deposits of some sort exist in many places, distributed over an area about three hundred miles long by about half as wide, in eastern New

(Just turn the page)

## Potash Beds

(Continued from Page 163)

Mexico and the Texas panhandle. We hope to make further core drillings, to obtain a better idea of the extent of the really rich deposits."

The new potash field is well served by railroads. Two lines run clear through it, and three others have branches into it at various points. Galveston is the nearest saltwater port, but practicable hauls might also carry the product to points on the Mississippi river. Geological Survey officials believe that for certain types of soil the minerals as they come from the shaft would need only grinding to make them satisfactory fertilizers, but for long hauls probably concentrating treatments would be advisable, to save bulk and weight. More or less rock salt occurs in between the layers of potash minerals, but this can be picked out easily by even the cheapest labor.

The exact geological age of the deposits has not been determined, but they are believed to belong to the Permian. This was an age of drought that intervened between the Pennsylvanian or coal age and the times of the dinosaurs. The beds were probably formed by a series of advances and retreats of an arm of the sea, which formed great salt-water lakes. These dried in the arid climate, just as the Caspian sea, or on a smaller scale the saline lakes of the West, are drying up today, and as they did so the various chemicals in solution were precipitated. The less soluble ones, like the compounds of lime and potash, came down first, and the easily soluble common sea salt only at the end of each drying-out, so that layers of salt now alternate with layers of potash and other minerals.

Russia has also been the scene of discovery of new potash deposits. These have been found in the district of Solikamsk, government of Perm, and declared by Soviet chemists to be Russia's delivery from the Franco-German fertilizer monopoly controlled through the Stassfurt beds, hitherto the world's principal source of this important mineral. The Russian deposits, it is stated, are found over an area almost a thousand square miles in extent, and beds capable of being mined exist as close to the surface as 300 feet.

Science News-Letter, December 11, 1926

Superior intelligence is about five times as common among children of better class parents as among children of inferior social status, a recent investigation shows.

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## Distant Milky Ways

Eight hundred and forty million million miles (840,000,000,000,000,000 miles) is the distance of the farthest object that astronomers can see with the great 100-inch reflecting telescope of the Mt. Wilson Observatory, the largest in the world, Dr. Edwin Hubble said in a recent lecture at the Carnegie Institution of Washington, of which the observatory is part.

The work of Dr. Hubble with this giant instrument has shown that our "Milky Way" or galaxy, is not alone in space, but that scattered around the sky are millions of other galaxies, many similar to our own, and all outside its confines. The spiral nebulae, which until recently were astronomical mysteries, are among these other galaxies, but they represent a late stage in their development, in Dr. Hubble's opinion.

"Their different forms," he said, "fall into a progressive sequence characterized by rotational symmetry around dominating nuclei. From small, compact globular masses, they flatten and expand into lens-shaped forms and then break up into the thin disc-shaped spirals." This series of observed forms of the nebulae, he pointed out, agrees well with a course of development outlined on theoretical grounds by Dr. J. H. Jeans, prominent English astronomer.

In some of the closer spiral nebulae that Dr. Hubble has observed, he has made photographs which actually show the individual stars, and from the study of these he has determined the approximate distances. But the ones that are farther removed have also had their approximate distances determined, because they all are of nearly the same average brightness. The fainter they appear, the farther away they are, on the average, and by counting the number with different apparent brightnesses, it is possible to determine their distribution in space.

"The faintest nebulae," said Dr. Hubble, "that can be detected with the largest telescope, the 100-inch reflector at Mt. Wilson, are at an average distance of 140,000,000 light years, a light year being the distance which light will travel in one year, going at a speed of 186,000 miles per second. One light year is about 6,000,000,000,000 miles. A sphere of 140 million light years radius comprises the observable region of space. Within this sphere are some 2,000,000 nebulae, distributed in a fairly uni-

form manner. Great clusters of nebulae do exist, but their effect on the distribution is averaged out when large volumes of space are considered.

"The nebulae are so distant that in observing them we are witnessing scenes and events which actually occurred in past geological ages. The nearest of them all, the Magellanic Clouds, present the appearance they had back in the great ice age. The spiral in Andromeda is a Pliocene object. The border of the observable region takes us back to the late Paleozoic. Recent events are on their way, traveling with the speed of light, but only a daring prophet would expect that man will still be on earth to receive them.

"The existing limits to the observable region are of a mechanical nature; with faster plates and larger telescopes, it will be possible to push them back to several times their present distance. In fact, with improvements that are believed to be thoroughly practical today, it might be possible to detect exceptionally brilliant nebulae at a distance of a thousand million light years, to photograph them with light started on its journey when the earth itself was young."

Science News-Letter, December 11, 1926

## ARCHAEOLOGY

### Tombs Yield Treasure

Golden drinking cups, necklaces of gold rosettes, silver signet rings, carved agates, and other ornaments of a workmanship that challenges comparison with the best jewelry of today and yet made at least 3,000 years ago have come to light in an ancient beehive tomb in Greece. The treasure was found by a group of Swedish archaeologists, headed by Prof. Axel W. Persson of Upsala University. The art objects, contemporary with the tomb of King Tutankhamen in Egypt, are now locked in a special safe in the Greek museum at Nauplia, where Prof. Persson has just returned for a detailed study of the finds, easily the most important since the German Professor Schliemann made his discoveries at Mycenae and Troy about thirty years ago.

How Prof. Persson came to make these thrilling finds, he explained in detail a few days before he returned to Greece in a lecture before the Upsala Society for Classical Philology at the University in Upsala, Sweden. Originally he was a member of the Archaeological Expedition to Greece that was organized and participated in by the Swedish Crown Prince, but before leaving the country

he was asked to investigate the reported find of a beehive tomb northeast of the Argive Plain at Dendra, a considerable distance away from the previous excavations at Asine, at the extreme southeastern tip of the Peloponnesos.

Usually the beehive tombs have been plundered of all contents centuries ago, but this one was intact and the antiquities placed as mementoes with the bodies of a king and queen and princess were most convincing proof of the high culture that prevailed in Greece during the Mycenaean Age, or before Homer. Pictures of such animals as lions and bulls decorated the golden vessels and rings while the war scenes artistically carved in the small agate stones on the signet rings aroused the immediate admiration of the excavators. Curiously enough the design of an octopus on the bottom of the king's drinking cup reminded Prof. Persson, he said in his lecture, of Japanese art, while certain prehistoric houses found in Greece recall the cubistic effects that ultra-modern architects achieve with reinforced concrete.

Originally the existence of a beehive tomb had been reported to the Greek authorities at Mycenae by a guide named Orestes who, while conducting an American woman to the ruined Mycenaean fortress of Midea, had noticed peasants removing flat stones from a tobacco field near Dendra, less than a mile from Midea. From his father, Dimitri, who had helped excavate beehive tombs in his youth, Orestes had heard of possible treasure finds under such stones and when the Swedish archaeologists were called in by Dr. Bertos, the Greek ephor, they quickly confirmed his suspicions.

Though caved in, the tomb had not been robbed and when cleared of its debris it measured eight meters in width and about the same distance in height, the vault being made of flat, unworked stones. Situated on a slight incline, the tomb was entered by a passage about 48 feet long and seven feet wide.

About sixty centimeters down began to appear the human bones and the bits of gold, Mycenaean necklaces about the skeleton of a girl, eighteen large and eighteen small gold rosettes of exquisite workmanship, and about the waist the thinly gilded ornaments of a girdle. In the other shafts were found the remains of a man and a woman stretched on beds of limestone and with golden vessels or ornaments placed about the bones that had not been touched for three thousand years.

Science News-Letter, December 11, 1926

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670 Manufactures  
680 Mechanic trades  
690 Building  
700 FINE ARTS—  
710 Landscape gardening  
720 Architecture  
730 Sculpture  
740 Drawing. Decoration. Design  
750 Painting  
760 Engraving  
770 Photography  
780 Music  
790 Amusements  
800 LITERATURE—  
810 American  
820 English  
830 German  
840 French  
850 Italian  
860 Spanish  
870 Latin  
880 Greek  
890 Minor languages  
900 HISTORY—  
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**MAKING A FIND.** George Langford (right) and his assistant Albert Ternik, removing objects from a newly discovered grave in the Fisher Mound Group.

### Indian Mounds

(Continued from Page 162)

must have been inter-tribal traffic in the metal, probably with the Indians of the upper Great Lakes region. The date of the middle layer therefore goes back again to an unknown antiquity, and considering the fact that the first of the upper-layer burials above it contain no European relics, this antiquity may easily be very great.

One expensive luxury only, did these aborigines permit themselves: the clay pots which they buried with their dead are of a very high order of workmanship for early Indian pottery. It seems to have been the invariable custom of the Indians of this period to bury the bodies of women and children with a pot of food as provision for the last long journey. Men were not so provided; presumably the collections of weapons placed as pillows beneath their heads were considered adequate to secure ghostly game for a brave. But a food-pot is always part of the furniture of a well-stocked grave, if a woman or a child lies there. As a rule there is a clamshell spoon in the pot, and frequently bits of bone from the meat.

Other finds have been eloquent of individual experiences in the dangers and hardships of savage life. One skull of a man, a thick and heavy skull, must be that of a warrior who died in battle, for a small chert arrow-head was found protruding from its broken temple bone when it was uncovered. Another skeleton was found with an arrow-head between its empty ribs.

Perhaps the most pathetic of such mute records of battle and sudden

death was the skeleton of a young squaw with the bones of an infant beside her. There was an arrow point between the bones of her forearm, and another under her left shoulder blade. It does not require much imagination to reconstruct the sudden raid of the tribe's enemies, the terrified flight of the young mother and her baby, the wound received as she tried to protect her child, and the deliberately aimed shaft that at last drove through her heart. This unsung Helen did not outlive the sack of her city!

To the student of Indian history and migrations, the most important thing about Mr. Langford's discoveries is the resemblance between the things these middle layer Indians made and the utensils, implements and tools of the Iroquoian group of recent and modern Indians in the eastern part of the United States. The Iroquois Indians were the backbone of the formidable Six Nations alliance which in Revolutionary days made endless trouble for the Americans, though they had at one time been the allies of the French against the English. Cooper's old favorite novel, "The Last of the Mohicans," deals with a part of the struggle against this formidable Indian alliance, said to have been one of the most highly advanced native American political arrangements north of Mexico. Hitherto nothing resembling Iroquoian handiwork has been found west of Ohio, and this discovery in Illinois may throw new light on the route of the predecessors of the tribe eastward to their final empire.

Science News-Letter, December 11, 1926

### Vanishing "Hawg"

The auk and the dodo must now make room for a newcomer in the Limbo of extinct animals. The razor-back hog, once a familiar sight in the piney woods of the South, is doomed to extinction. During the State Fair of Texas, a razor-back sow and her shoat were on exhibit in the Live Stock pavilion just to show what sort of animals once grew in the South. Live stock experts declare that the genuine razor-back is as much of a curiosity to the younger generation as many animals now exhibited by circuses or that are kept in many of the zoological gardens of Texas and other southern states.

The Texas Museum of Natural History, an institution devoted to the study of natural wild life of this state, has classed both the razor-back hog and the long-horn steer as animals doomed to early extinction and plans are now under way by which mounted specimens of both will be placed in the Museum's permanent collection.

W. H. Standish of Lyons, Ohio, a world authority on breeds of live stock, who judged dairy cattle at the State Fair of Texas, declared the razor-back hog has become such a curiosity in many sections of the South that it is of greater interest to many school children than a camel or lion, both of which are common sights to all children of the cities where zoos are maintained and that are frequently visited by the great circus parades.

Science News-Letter, December 11, 1926

### ASTRONOMY

#### Meteors Reveal Heavens

The only imports to this earth of ours, the meteors that flash in the night, are being studied by the Harvard College Observatory in the hope that they will throw some light upon the composition of the mysterious dark nebulae that appear in parts of the sky. These dark nebulae are believed to be immense heavenly clouds of dust and it may be that the "shooting stars" that are seen from earth are similar particles of stellar dust that plunge into the earth's atmosphere at the high rate of speed of 25 miles a second. Study of photographs of meteor trails, which are hard to obtain, show that some of them are discontinuous and that often one trail breaks up into two or more. Plans are under way to photograph meteors from various parts of the earth in order to discover their secrets.

Science News-Letter, December 11, 1926

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## Diseases Reach Peak

The year 1926 has experienced a wave of very high mortality from measles and whooping cough. This is in accordance with what seems to amount almost to a natural law, namely, that these diseases rise to a peak together, periodically, about every seven years, the last peak having been about 1920. This fact has been established by statistics analyzed by the Metropolitan Life Insurance Company, covering the four principal diseases of childhood, namely, measles, whooping cough, scarlet fever and diphtheria. These four diseases have run a fairly parallel course, and from a study of the Metropolitan's charts, based on the figures collected by the United States Census Bureau, it is shown that there is particularly close correlation between measles and whooping cough. The causes of the periodicity and of the parallel course of these diseases have, so far, found only tentative explanation. It has been suggested that some circumstance in the life cycles of the organisms causing these diseases may have something to do with their recurrence at regular intervals; or, perhaps, the seven year period may be related to astronomical phenomena influencing weather conditions.

Fortunately, the general level of these childhood diseases has been decreasing in past years, but the seven-year peaks still continue consistently to put in their appearance. In the present year, the wave in measles and whooping cough has risen to an exceptionally high crest. It may reasonably be expected that the peak has been passed for these two diseases, but it cannot be assumed offhand that the danger is passed for scarlet fever and diphtheria. In the case of scarlet fever present indications are favorable, as the death rate in 1926 has been quite low. As for diphtheria, there is nowadays a recognized and thoroughly tested preventative known as toxin-antitoxin, and physicians, school teachers and parents are advised by medical authorities to bear this in mind, to consider the advisability of Schick tests and to act on the strength of this warning. With such precautions made available by modern medical research, the year 1927 ought to be a good one for the youngsters.

Science News-Letter, December 11, 1926

If cod-liver oil is kept in the sun it loses its valuable vitamin A which promotes growth, though vitamin D that prevents rickets is not affected.

## 5000 Year Old Glass

By E. N. FALLAIZE

Where and when was glass first made? In a lecture recently delivered in London, England, to the Society of Glass Technology, Professor Sir Flinders Petrie in giving an account of the origin and distribution of Early Glass, said that no glass was made in Egypt before 1500 B. C. Up to that date all glass found in Egypt was imported. In Mesopotamia, however, glass was being made as far back as 2500 B. C. The connection between Egypt and Syria which followed the conquests of the Egyptian monarchs of the 18th dynasty led to the introduction into Egypt of a large number of Syrian workers in various branches of the arts, and within fifty years of that date glass became one of the commonest objects in Egypt. The most popular use of glass in ancient Egypt was in the form of glass beads of which enormous quantities have been found in the course of excavations.

The popularity of glass beads has been one of the most fruitful pieces of evidence with which the prehistoric archaeologist has had to deal. Beads are among the more important objects, by tracing the distribution of which it has been possible to demonstrate the movements of early peoples, of early cultures, and the lines of early trade routes through Europe, Western Asia, and North Africa in prehistoric and early historic times. In this way has been traced the regular trade route by which amber, which was highly prized by early peoples, was brought from the Baltic to the Mediterranean in these early days.

In the early days of its manufacture, glass was not brought to the melting point but was used in the form of a paste. No blown glass was made until the Christian era. The use of a vitreous paste in the form of enamel was a favorite method of decoration on metal in early Europe and reached a very high point of technical development. The beautiful blue and red enamel manufactured in Great Britain in the Iron Age was highly prized, and with reason, as is shown by the famous bronze shield with enamelled bosses and foliate ornament in resposé of Iron Age date found in the Thames at Battersea, London, some years ago and now in the British Museum. The British Museum has also some very beautiful horse-trappings in red and blue enamel of the foliated design known as Celtic.

(Just turn the page)

## Wheel Greatest Invention

What is the most notable thing that man has created? The wheel is accorded first place by Hilaire Belloc, who, in an essay with which he prefaces his pictorial history of the vehicle, glorifies this instrument of man. The volume, which has recently been published under the title, "The Highway and Its Vehicles," contains more than a hundred reproductions of old manuscript illustrations, paintings, lithographs, and woodcuts, picturing the development of the vehicle from the hammock-wagon of the twelfth century to some early motor-cars which are being raced by horses and even dogs.

The highway, which has so largely conditioned human history, was made by the vehicle, but the vehicle became possible only through the creation of the wheel. In comparing this discovery with others of fundamental importance, the author points out that fire was an existing thing which was only captured and tamed by man, whereas music, plastic art, and building were mimicked from nature, but the wheel is a work alone of man's conception—a fact on which to nourish his pride.

Aside from its original purpose of providing easy communication, the wheel has lent aid to man in a multiplicity of functions; in grinding his corn; in turning ornaments and the furniture of his house; in drilling holes for him; in moulding his clay; in telling the direction of the wind upon his mastheads; in lifting weights out of wells, and in acting as a pulley for the development of the earliest sailing craft.

From these simplest uses the wheel has branched out in one direction after another, supplementing and extending man's power. Of its recent marvellous extension, the author states: "It gives us electrical energy to use; it transmits power; it keeps time for us; it measures all things from a map to the speed of light; it permits our curious toys such as moving pictures. It endows us with the special use of the gyroscope; it drives our turbines by steam and water, and soon perhaps by air. It even aids us in our vices, and by its impersonality and exactitude it makes our gambling reasonably impersonal."

Science News-Letter, December 11, 1926

Glycerine can be obtained from petroleum.

Thistles in Argentina grow in thick forests higher than a man's head.

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## 5000 Year Old Glass

(Continued from Page 169)

The aim of the glass manufacturers of the early days was to imitate the color of natural objects, and some beautiful effects were obtained. They were able to produce a beautiful purple-blue coloring which even with modern methods was most difficult to obtain.

Glass was also used by the ancients for standard weights. In their manufacture remarkable accuracy was attained. Three glass weights of the same denomination when tested were found to be in agreement with one another within 1/200th of a grain.

Science News-Letter, December 11, 1926

Zebras are vicious and very hard to train.

Buffalo milk is being tried out in China.

Consumption is the final stage of tuberculosis.

Ants move at a faster speed in warm weather.

People in Japan had no horses until early in the Christian era.

Awnings for automobile windows are a new car accessory.

Gold in sea water is mostly in the form of an insoluble slime.

Steam spray is being used by paper hangers to remove old wallpaper.

Boys played marbles even in the early days of the Indian mound builders.

An electrically operated passenger cable line up Mont Blanc is being built.

A height finder is a recent device for use by gunners attacking enemy airplanes.

When writing a book, Balzac sometimes worked 18 to 20 hours a day for weeks.

The first wall paper factory in this country was established in Albany, New York, in 1790.

Projected water power installations for Italy, Germany, Belgium, and France total several million horsepower.

In the past six years electric refrigerators in American homes have jumped from 3,000 to more than 142,000.

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- WHAZ Rensselaer Poly. Inst., Troy, N. Y.
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## Character and Faces

Why senators get mistaken for Bolsheviks and financiers for bootleggers when an individual attempts to judge their places in life by looking at photographs, is explained by Dr. Stuart A. Rice, psychologist at the University of Pennsylvania. Dr. Rice has just reported results of an investigation in which 258 students at Dartmouth College acted as judges of personality.

The reason why a human being's face cannot be accurately rated in character and intelligence by the observation method, just as horses and dogs are judged at prize shows, is traced to the fact that each person carries about in his mind type pictures of what a king, a criminal, or a scholar should look like. These mental pictures, or stereotypes, Dr. Rice explains, are made up to a considerable degree of superficial earmarks such as the cut of the hair, the mode of wearing collar and tie, and similar details of appearance.

In the test the college students were shown pictures of nine individuals taken from a newspaper of two years ago. They were told that one of the nine was a senator, one a labor leader, two were manufacturers, and so on, and each picture was to be fitted with the most suitable title.

Dr. Rice reports that: "In the case of Krassin, the Soviet Envoy, a wing collar, Van Dyke beard and moustaches contribute to an appearance that may be described as distinguished, and which no doubt led to 59 identifications as the U. S. Senator, in comparison with nine as a bolshevik and none as a labor leader. Senator Pepper received as many or more identifications as labor leader, bolshevik, financier, editor-politician, and manufacturer than he received in his own senatorial capacity.

"The largest number of correct identifications was made in the case of the alleged bootlegger. This individual alone was pictured in out-door costume. He is shown in a heavy overcoat with up-turned collar, a cap, tortoise-shell glasses and cigar gripped firmly between his lips."

Different groups of students were also asked to estimate the intelligence and craftiness of each of the nine individuals. When the students were told correctly who the individuals were, they rated the persons of highest rank and position as being higher in intelligence and lower in craftiness than they did when they were misled as to the correct identity of the pictures.

Science News-Letter, December 11, 1926

## Fossil Ivory Ornaments

Modern Eskimos of Alaska supply hand-carved bric-a-brac of fossilized ivory, millions of years old, to the tourist trade and novelty shops of the Northwest.

Cribbage boards, bracelets, paper-knives, and bead necklaces that show the influence of ever advancing civilization grafted onto the primitive walrus tusk etchings of an older age have recently been put on display at the U. S. National Museum. Some of these examples of an old-new handicraft were brought back by Dr. Ales Hrdlicka, anthropologist of the museum, from his recent expedition to Alaska.

Another collection has just been presented to the museum by Carl Loman, reputed to be the largest reindeer herder in Alaska, that contains many valuable specimens of the ancient primitive art, as well as beautiful examples of the new.

The fossilized walrus ivory used by both the ancient and modern Eskimos acquires through the centuries rich mottlings of grey and deep cream color, deepening in some pieces to an iridescent sheen, comparable in beauty to Chinese carvings of jade and agate. Though new ivory is used in many carvings, necklaces and amulets of the old world, when obtainable, certainly occupy a well deserved place in the current vogue for semi-precious jewelry.

Science News-Letter, December 11, 1926

## Jar on Indian's Stomach

An earthen effigy jar in the shape of an animal said by the Hopi Indians to represent an antelope was one of the most curious objects unearthed recently near Flagstaff, Ariz., by Dr. J. Walter Fewkes, ethnologist of the Smithsonian Institution. It was found buried on the abdomen of an Indian priest.

The surface of the jar was elaborately decorated, and was undoubtedly used for religious purposes, Dr. Fewkes said, and probably as a container for holy water or sacred meal. A splendid collection of pottery, numbering over 300 unbroken vessels, as well as many curious fragments, was obtained from the site of an ancient Indian cemetery near the Pueblo. He also gathered rings, bracelets, turquoises, shells, and other ornaments. Dr. Fewkes considers his summer's work at Elden Pueblo, six miles from Flagstaff, one of the most successful of his career.

Science News-Letter, December 11, 1926

## NATURE RAMBLINGS

By FRANK THONE



Witch-Hazel

The last rose of summer, even the last of the hardy roses that modern horticulture has produced, is long since gone, and with it the last of the asters and gentians and all the other late-autumn flowers. But in the undergrowth of our richer woodlands one flower still blooms on, and before even the alder and skunk-cabbage burst forth next spring it will be there again.

To be sure, it isn't much of a flower, judged by summer-garden standards: just four little yellowish sepals bunched together on a nubbin little twig, and between them four string-like, sprawling, twisty yellow things that the botanists tell us are petals, though they certainly do not look much like them. But such as they are, the flowers of the witch-hazel are with us—the last flowers of fall, or the first of spring, as you choose, if you are prejudiced against admitting that flowers can bloom in the winter.

The flowers of the witch-hazel are very leisurely affairs. They remain open for a long time, and the pollen that goes from one to another (probably by wind, for where are the insects now?) takes months to complete the process of fertilization. Then the small, brown, cross-slashed fruits form with equal deliberation, and at last expel their tiny, black seeds, like shots from miniature pistols, to take up the job of producing new witch-hazel bushes where they fall.

Extract of witch hazel leaves still enjoys a large sale in the drug stores, though much skepticism has arisen concerning its virtues as a surface antiseptic. Physicians seem to be inclined to ascribe its effects almost wholly to the 25 per cent of alcohol, more or less, that it contains, and some chemists have stated that they find traces of formaldehyde in it also.

The shrub is said to have received its name from the favor it enjoyed among the necromantic gentry who used forked wands of its wood in divining or "dousing" for well-sites and buried treasure.

Science News-Letter, December 11, 1926



# Science Service Books

In cooperation with leading book publishers, Science Service has taken part in editing the following books on science:

- CHATS ON SCIENCE.** By Edwin E. Slosson. New York: The Century Company. 1924. \$2.00.
- SCIENCE REMAKING THE WORLD.** Edited by Otis W. Caldwell and Edwin E. Slosson. New York: Doubleday, Page & Co. 1923. \$2.50 and \$1.00.
- KEEPING UP WITH SCIENCE.** Edited by Edwin E. Slosson. New York: Harcourt, Brace & Co. 1924. \$2.50.
- WHY THE WEATHER?** By C. F. Brooks. New York: Harcourt, Brace & Company. 1924. \$2.00.
- SOIL AND CIVILIZATION.** By Milton Whitney. Library of Modern Sciences. New York: D. Van Nostrand Co. 1925. \$3.00.
- ANIMALS OF LAND AND SEA.** By Austin Clark. Library of Modern Sciences. New York: D. Van Nostrand Co. 1925. \$3.00.
- THE EARTH AND THE STARS.** By C. G. Abbot. Library of Modern Sciences. New York: D. Van Nostrand Co. 1925. \$3.00.
- MYSTERY OF MIND.** By Leonard Troland. Library of Modern Sciences. New York: D. Van Nostrand Co. 1926. \$3.00.
- FOUNDATIONS OF THE UNIVERSE.** By M. Luckiesh. Library of Modern Sciences. New York: D. Van Nostrand Co. 1925. \$3.00.
- CHEMISTRY IN MODERN LIFE.** By Svante Arrhenius, translated and revised by C. S. Leonard. Library of Modern Sciences. New York: D. Van Nostrand Co. 1925. \$3.00.
- CHEMISTRY IN THE WORLD'S WORK.** By H. E. Howe. Library of Modern Sciences. New York: D. Van Nostrand Co. 1926. \$3.00.
- STORIES IN STONE.** By Willis T. Lee. Library of Modern Sciences. New York: D. Van Nostrand Co. 1925. \$3.00.
- EVERYDAY MYSTERIES.** By Charles Greeley Abbot. Young People's Shelf of Science. Edited by E. E. Slosson. New York: The Macmillan Co. 1923. \$2.00.
- DWELLERS OF THE SEA AND SHORE.** By William Crowder. Young People's Shelf of Science. Edited by E. E. Slosson. New York: The Macmillan Co. 1923. \$2.25.

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Science News-Letter, December 11, 1926

**A DOCTOR'S MEMORIES**—Victor C. Vaughan—*Bobbs-Merrill*. (\$5). Those who know Dr. Vaughan necessarily love and appreciate him. His autobiography, telling of one of America's most useful and eventful lives, gives an opportunity for others to meet and know him.

Science News-Letter, December 11, 1926

**A BIPOLAR THEORY OF LIVING PROCESSES**—George W. Crile—*Macmillan*. (\$5). Dr. Crile has reached the conclusion through years of research that life and death is a matter of electricity. His thrilling, clear, but necessarily technical story leads to a premise which would bridge the gap between the living and the non-living and suggests a physical line of ascent from atom to man.

Science News-Letter, December 11, 1926

**THE PROBLEM OF PHYSICO-CHEMICAL PERIODICITY**—E. S. Hedges and J. E. Myers—*Longmans, Green*. (\$2.75). Rhythmic pulsation or intermittency is more common in biology than chemistry, but this critical summary shows that it plays a part in the non-living world as well.

Science News-Letter, December 11, 1926

**SOCIAL ANTHROPOLOGY**—Géza Róheim—*Boni & Liveright*. This is an attempt to decipher man's past from man's present by following up the clues supplied by the psycho-analysis of contemporary human material, using Australian totemism as the examples.

Science News-Letter, December 11, 1926

**THE EARLY MENTAL TRAITS OF THREE HUNDRED GENIUSES**—Genetic Studies of Genius, Vol. II—Catharine M. Cox—*Stanford University Press*. (\$5). The intelligence and mental character of 300 of the world's geniuses in childhood are here appraised by historiometry; and a valuable collection of data, shedding light on the early signs of great ability, is the result.

Science News-Letter, December 11, 1926

## Books on Botany

**OUTLINE OF PLANT GEOGRAPHY**—D. H. Campbell—*Macmillan*. **PLANTS AND MAN**—F. O. Bower—*Macmillan*. **THE FAMILIES OF FLOWERING PLANTS. I. DICOTYLEDONS**—J. Hutchinson—*Macmillan*. **A DICTIONARY OF THE FLOWERING PLANTS AND FERNS**—J. C. Willis—*Macmillan*. **TREES IN WINTER**—A. F. Blakeslee and C. D. Jarvis—*Macmillan*. **FLORIDA WILD FLOWERS**—Mary F. Baker—*Macmillan*.

This is a really remarkable collection of books on one subject for a single publisher to bring out in a year, the more so since every one of them represents a definite contribution to the field. Teachers of ecology, plant geography and taxonomy, for instance, will give a most hearty welcome to Campbell's compact and up to date "Outline," because they have hitherto had to depend almost wholly on massive works like Schimper which even in translation are somewhat tough mouthfuls for university students. "Plants and Man," though Scottish-written, does not need to be exclusively Scottish-read, for it reaches out into all the world for its materials, and is presented in an admirably simple and clear style.

Dr. Hutchinson's book has already stirred up much conversation among the professional taxonomists, who agree that their branch of the science is in confusion, but who disagree on almost everything else about it. Dr. Hutchinson's views may or may not ultimately prevail, but at any rate they render good service now by giving a point of departure for discussion. The book completes a task begun over twenty years ago by A. B. Rendle, who worked over the gymnosperms and monocotyledons.

Dr. Willis' book is a new edition of a work that has been a standby among botanists since 1897; this revision will be welcomed as its predecessors were. "Trees in Winter" is another well-established favorite, both with the profession and among the well-informed laity, which now comes to the point of re-printing. Miss Baker's Floridian flora is something more than a local book, now that everybody who owns a flivver and a campstove can go south for the winter. The author makes a happy combination of brief popular discussions with concise technical synopses, and she includes a large number of good photographs.

Science News-Letter, December 11, 1926

The Parthenon, built as a temple to Athena at Athens, was used as a church early in the Christian era.

BOTANY

PSYCHOLOGY

## Cave Man Art

Quotation from **MEASUREMENT OF INTELLIGENCE BY DRAWINGS**. Florence L. Goodenough. World Book Company.

The literature of children's drawings abounds in comparisons between the drawings of modern children and those made by prehistoric man or by primitive races of the present day.

It is obvious that no really valid comparison can be made between the paper and pencil drawings of the modern child and those which prehistoric man smeared on rock walls with a finger dipped in wet clay, or carved out by means of a piece of flint. Moreover, we have no way of knowing what purpose these prehistoric drawings were intended to serve. A carefully executed piece of work which is intended to be an accurate representation of a given object is a very different thing from the hasty sketches which are frequently made by way of giving point to an idea or merely for amusement. We have no reason for believing that the specimens of prehistoric art which have chanced to be preserved are, in all cases, the best which prehistoric man produced, and there is still less ground for the assumption that he could have done no better if he had been provided with the tools which are at the disposal of the modern child. When, in addition to these factors, we consider the unknown but probably very great influence that is exerted upon the drawings of present-day children by the pictures found everywhere in their environment, the uncertain ground which underlies even the most tentative comparison between work done under such widely disparate circumstances becomes evident.

Science News-Letter, December 11, 1926

PHYSICS

## Light—\$50,000,000 An Ounce

Quotation from **THE UNIVERSE OF STARS**. Chapter "Weighing Light" by Edward S. King. Harvard College Observatory. Mr. King is an astronomer at the Harvard Observatory.

If light responds to gravitation, it may be regarded as having real weight. Shall we buy light by the pound or by the ounce, and at what price? If the weight of light is proportional to its mass, an ounce will be enormously expensive, as measured by the cost of light furnished by gas and electric light companies. On that basis, an ounce of light would cost \$50,000,000, and yet the sun showers down on us daily 160 tons of this precious stuff. Some day we may learn how to store up the golden flood of sunlight.

Science News-Letter, December 11, 1926

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## Anniversaries of Science

**December 16, 1842.**—Prof. Samuel F. B. Morse, in testing out his telegraphic system in Washington, "so arranged my wires along the banks of the river as to cause the water itself to conduct the electricity across."

The current was carried across the canal, then by wires a few feet down the bank, then back by the water of the canal. This was the first telegraphy without wires.

**December 16, 1902.**—Marconi dispatched the first wireless message across the Atlantic Ocean.

**December 17, 1903.**—Orville Wright flew the first heavier-than-air machine for the first time.

Practical efficiency was acquired by the Wright brothers, whose flying machine was successfully tested on the 17th of December. For three years they experimented with gliding machines. . . . and it was only after they had obtained thorough command of their movements in the air that they ventured to add a motor. How they accomplished this must be reserved for them to explain, as they are not yet ready to make known the construction of their machine nor its mode of operation.

—O. Chanute: *Aerial Navigation*, paper read before the American Association for the Advancement of Science, December 30, 1903.

**December 17, 1778.**—Birth of (Sir) Humphry Davy.

His first experiments were the effects of acids and alkalis on vegetable colors, the kind of air in the vesicles of common seaweed, and the solution and precipitation of metals. These were made in his bedroom in Mr. Tonkin's house, or in the kitchen, when he required fire. This old gentleman had brought up his mother and her two orphan sisters, and now was like a father to Humphry. He said, "This boy Humphry, is incorrigible. Was there ever so idle a dog! He will blow us all into the air." He was at this time probably making a detonating composition, which he called "thunder power," his sister Kitty being his assistant.

—Bolton: *Famous Men of Science*.

**December 22, 1891.**—Asteroid No. 323 discovered photographically by Dr. Max Wolf of Heidelberg. It was the first asteroid to be found by this method.

Here, night by night, the innumerable heavens

Speak to an eye more sensitive than man's,  
Write on the camera's delicate retina  
A thousand messages.

—Noyes: *Watchers of the Sky*.

Science News-Letter, December 11, 1926

Highway officials in Washington State are using electromagnets to clear the roads of nails and other bits of iron that are hard on auto tires.

## ZOOLOGY

### Geraniol Lures Beetle

A scent like that of the old-fashioned geraniums in our grandmothers' gardens is to prove the undoing of the Japanese beetle, which has been a most destructive pest in the Eastern truck garden and orchard region for several years. The U. S. Bureau of Entomology has recently discovered that the beetles are attracted by the scent of geraniol, the odorous principle of geranium plants. Comparatively cheap mixtures of this chemical have been made and are sprayed upon a small group of trees with the result that the beetles to the windward side will congregate for half a mile around. They are then easily killed by a contact spray of a diluted pyrethrum extract. The experiment was tried upon comparatively small infested areas last summer but will be used extensively during the coming season.

Other methods of killing the beetles include the introduction of parasitic wasps and flies from Japan, China and India, and the treatment of the soil of lawns and golf courses where the larvæ feed with arsenate of lead. Shade trees have been protected by treatment with arsenate of lead coats applied before the appearance of the insects.

The spread of the insects through commercial carriage is retarded by government quarantine about the infested territory, but the flight of the beetles, which cannot be controlled, has brought about an extension of the infested area. It now includes the southeastern corner of Connecticut, the southeastern end of New York, all of New Jersey, much of southeastern Pennsylvania, and the northeastern part of Delaware, a total of some 10,000 square miles.

The beetle was accidentally brought to this country about ten years ago in the grub state in soil about the roots of Japanese iris.

Science News-Letter, December 11, 1926

## ENGINEERING

### Stanford Studies Aviation

An extensive program of aeronautic research and training of aeronautic engineers will soon be inaugurated at Stanford University as the result of a grant from the Guggenheim fund. It has recently been announced. The present aerodynamics laboratory, in which experiments have been under way for the past ten years, will be enlarged and housed in a new building, while a six-year course in aerial engineering will be established.

Science News-Letter, December 11, 1926

## MOTOR VEHICLES

### Traffic Accidents

While public education and propaganda have touched upon the high spots of traffic dangers much research is needed on the less obvious causes of fatal accidents. Dr. H. C. Dickinson of the U. S. Bureau of Standards has reported to the Highway Research Board of the National Research Council that the responsibility of the highway engineer is greater than statistics would indicate.

The construction of highway surface, said Dr. Dickinson, is an important element in skidding accidents. While much has been done on banking and widening curves, more research is needed on this fruitful cause of fatalities.

"Running a tangent into an arc of a circle obviously produces a curve," continued the expert, "which can be only approximated by a vehicle, since to follow the curve would require the instantaneous shifting of the steering wheel from the position of a straight line motion to that for the constant radius of curvature for the circular arc. This is evidently impossible. Doubtless a study of the traffic lines on a stretch of new concrete would show how nearly the average driver can approximate this instantaneous curve."

The psychological effect of traffic laws and regulations on people is a point of considerable importance that should receive further attention, he declared. Most laws affect only the relatively small criminal element in the population but traffic laws are of concern to about half the citizens of the country. Consequently their right or wrong reaction to such regulations is of considerable importance. A too low speed limit is a common example that frequently defeats its safety purpose because the driver thinks it is too low, exceeds it, and keeps his attention on "watching for the cop" instead of the safety of himself and his vehicle for which the law was designed.

Science News-Letter, December 11, 1926

Goldfish should be kept in an open-topped bowl or tank, rather than in a small-topped globe.

One egg, per hen, per year, it was found, paid for the electricity used to stimulate egg production on poultry farms in England.

Nitrogen, an unsocial element, dislikes to join into chemical combinations and retires to its elemental condition under the slightest provocation.



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